
Trinet: A Game Illustrating the Subtle Power of Convergent Product Design

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Abstract

Trinet is a new game that combines elements of physical play with enhancements made possible by technology; the result is a digitally-enhanced game focused around the need people have for social relationships. Trinet merges aspects of successful physical games with new technology to create an experience with unique pacing; this outdoor experience encourages human to human interactions and emphasizes the social relationships inherent in gaming.

Keywords

User-centered design process, Future gaming, Digital game interaction, Industrial design, Interaction design.

ACM Classification Keywords

H.5.1 Multimedia Information Systems.

Introduction

Trinet is a result of a user-centered design process intended to explore new opportunities for the future of games. Many popular games in the digital game market are aimed at providing an intense experience for users. This genre of games includes "console games" or "arcade games", and the basic premise of these experiences has changed very little since first introduced. While technological advancements have

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FNG2006, June 26–28, 2006, Preston, England.

ACM 1-xxxxxxxxxxxxxxxxxxxx.

made graphics more realistic and games more complicated, the style of the games played on the console or arcade systems has essentially stagnated [1]. The gaming industry seems stuck in a rut: it is difficult for game designers to create more interesting games, as the market dictates a certain style and method of gaming, but technology has afforded opportunities to explore dramatically different gaming scenarios and situations.

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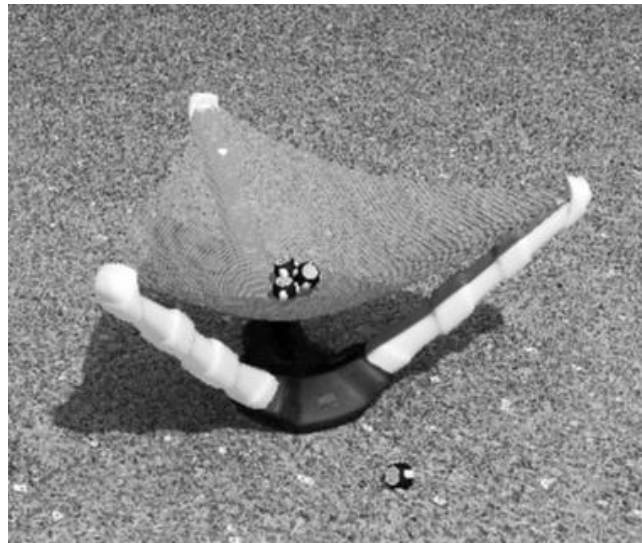


figure 1. Trinet consists of a tripod shaped net (called the Trinet) and digitally-enhanced balls (called Throwers).

Trinet is as an example of the integration of high-tech functionality within a physical game. The game

considers strategy, pacing, social interactivity, and elements of surprise.

The game requires the use of tripod-shaped nets called *Trinets* and the use of twenty small balls called *Throwers*. The game play is simple: when the game begins, players attempt to throw their Throwers into the various Trinets, and work to block their opponents from doing the same. Both the Throwers and the Trinet are “smart”. For example, players cannot be within ten feet of a Trinet in order to score point; the Trinet is able to measure distance digitally. Prior to launching the Thrower at the goal, the user shakes the device. This shaking sets the “mode” of the Thrower (which can be one of six functions, some of which are positive while others are negative), thus introducing an element of randomness. Once the player throws the Thrower into a Trinet, a sensor within the Trinet reads the Thrower and affects the score accordingly.

The pacing of the game alternates between a highly frenzied state and a more refined, strategic approach; as players run out of Throwers, it becomes strategically imperative to switch from an offensive stance to a defensive position. The Integration of digital technology into the game frees the players from having to keep score, and allows for the unique pacing. The randomized function of the Throwers adds an element of excitement to the game. The simplicity of throwing the ball into a net encourages adults and children of all ages to play the game without complicated rules and instructions.

Initial Research

This project began with a session of brainstorming. An affinity diagram was used to analyze terms related to

the discipline of gaming. Affinity diagramming is a popular method that designers and researchers use to find a focus within a complicated discipline [2]. The end result of the affinity diagram is a taxonomy of terms indicating relative importance of the words; through this exercise, it became obvious that the user is a critical part of any game, but is frequently ignored in many high-tech console games. People to people interactions are common in nearly every game with "staying" power (such as Billiards, Chess, or Golf). The affinity diagram also pointed towards categories ripe for further researcher. These categories included *locations*, *methods of play*, *characteristics of games*, and *emotions*.

Contextual research was then conducted to understand the culture and nuances of gaming. Research was conducted at an arcade and at an entertainment complex (offering games like Laser Tag).

At the arcade, it became obvious that the games were generally fast paced and visually intense. One might deduce that the more lights, sounds, colors, and distractions there are in a game, the "better" the game is. The players at the arcade seemed very energetic while playing the various games, even though there were a very limited number of inputs through which to interact with the systems. These inputs included Joysticks, Push Buttons, Foot Pedals, Steering Wheels, Guns and Step Pads, and players were observed interacting with these inputs in a very aggressive and physically engaged manner.

Dance Dance Revolution, known as DDR, is a popular mix of physical interaction and music. Through observation, it appeared that DDR attracts a specific

type of competitive individual. Users who played DDR did not tend to play the other arcade games, while users who did not play DDR changed games numerous times. The input controls for DDR are very different from the other type of games. DDR requires foot-eye coordination while all other games require some form of gross hand-eye coordination. One girl was observed played DDR several times, stopping to take a break in between games; she was clearly physically exhausted, and required a break to regain energy. The open nature of DDR made the game much more of a spectator sport than the other games. The screen was open and placed away from the user which allowed and encouraged other people to watch from a distance. The official DDR website contains over 80 products and variations of the game.

At the entertainment complex, it was observed that users playing Laser Tag were completely immersed in the game play. As compared to the limited inputs described above, Laser Tag requires a complete physical commitment to the game which seems to change the perception of time while the game is played. The game was very fast paced but was very linear in its objectives, and seemed to require less logical thought and more physical exertion. Each task in the game was disjointed and individualized. One player would shoot another player and then stop shooting either after running out of "ammunition" or after locating another player from the other team. After playing, most of the players appeared to be breathing much harder than before the game started.

Laser Tag is clearly enhanced by technology, but the role of the computer was completely hidden and was only apparent when it came to scoring (at the end of

the game). Although each individual's statistics were recorded and transferred to a core system that evaluated the data, each member seemed disconnected from the "whole" and seemed to be focused only on themselves. While the game appeared from afar to encourage social interactivity, it in fact isolated players in a manner similar to that which was observed in the arcade.

Additional research was conducted through informal interviews. One of these interviews was with Ashley, a 21 year old female who plays games often but does not like to play "video games". Instead, she enjoys board games, "drinking games", ping pong and sports. She explained that digital games don't appeal to her because she "doesn't want to sit there and feel like she is doing nothing with her life." Ashley also explained that "when it requires physical exertion, it becomes competitive. And if I'm not good at it, I don't take it seriously".

Synthesis

After conducting extensive research into the discipline of games and gaming, it was necessary to make sense of the seemingly un-related data that was gathered in order to guide design. This "synthesis" of data allows the designer to find patterns or design guidelines. The results of synthesis provides a framework for working, and creates a set of "key points" to keep in mind while designing. These points are listed below.

1. Games are a vehicle to exercise knowledge in a harmless manner. They are seen as, and should encourage, a "lack of seriousness".

2. Games allow users to be challenged, to learn, to discover, to be surprised, to have fun, to compete, and most importantly: to socialize.
3. Games can be active or passive, physical and non-physical
4. Users must go through a process when interfacing with a game
5. Traditional games have a slower pace than digital games, while digital games require more active attention
6. Games are methods for exchanging information between players
7. Games are models for complex situations
8. Games can help players form an identity or can represent a subculture

Personas

Designers often use personas to better understand potential users of their products. Personas offer a method for creating user goals, and remind the designer that there is ultimately a person who will use their creation. Personas help the designer focus on the user, rather than focusing on issues of technology, manufacturing and design aesthetics [3].

Personas with different personalities were created for the game. The development of the personas was influenced directly from the research conducted.

Clark is one of the developed personas.

Clark is seventeen years old and admits he isn't the "most popular" kid at school. He plays chess a bit and loves old James Bond movies. Most of the time, Clark is

pretty quiet and introverted. He doesn't enjoy most commercial video games because there is a lack of intellectual challenge required; although he appreciates the graphics in many of the new Playstation games, the familiar "shoot everything that moves" attitude just doesn't do it for him.

Ideation

During ideation, the combination of user research, synthesis and personas direct idea development. Ideas are sketched rapidly, with the goal of producing a multitude of wildly different design solutions. For this project, the purpose of the first phase of ideation was to develop generalized concepts. Most of these concepts considered or emphasized time, social interactions, and physical motion.

The results of the ideation sketching included games that involved many high tech components to extremely simple games that involved throwing a ball into a net. This type of game – a simple throwing game – was ultimately selected as the final direction for several important reasons. The concept was most complete in its game play; it was simple, yet could use technology in new ways; and it included both physical and digital elements.

Once the concept was established, detailed sketches provided a host of variations. These variations allowed for the design and analysis of specific details about the game; the variations commonly included storyboards to illustrate game-play evolving over time.

Prototyping

Once the design direction was established, the design was physically prototyped to further understand the

technical requirements, the physical feasibility of the design and nuances of the gameplay. The prototype focused on the functionality of the interface and the general nature of throwing small objects into a triangular net. When users tried the prototype, they intuitively understood how to operate the game. In several instances the balls were bounced into the bin rather than thrown. The spherical form of the balls afforded this action.

The design proved to be entertaining yet the act of retrieving the balls seemed to become tiring. The physical weight of the balls was noted as an important consideration for the design of the final Thrower.

The second phase of prototyping emphasized the form and how the Trinet design would function as a target for small ball shaped objects. By observing users throwing balls at the Trinet, it became fairly easy to determine the total weight of the design, the tension of the net, and the size of the Trinet itself.

Refinement

After the prototype was tested, it became apparent that the innovative aspect of the final design would come from the details of the designed objects themselves. Through additional sketching and 3D modeling, the details of the design were realized. The game was refined to include the two primary elements: a small digital ball called a *Thrower*, and a tripod-based net called a *Trinet*.

The design of the Trinet allows for mobility: the entire system can easily be transported from location to location. This design feature allows the game to be played indoors and outdoors and it can be stored

easily. The simplicity and scale make the design much more accessible to the target age group of middle to late teenagers.

The design of the final Thrower incorporates both light and dark accents. This aspect of the design improves visibility on light and dark surfaces and allows the design to be used at the beach as well as a park or poorly lit area. To protect the internal components, the outer white accents are made of durable rubber. The top screen is made from scratch resistant clear high density polyethylene plastic along with the main casing which is opaque.

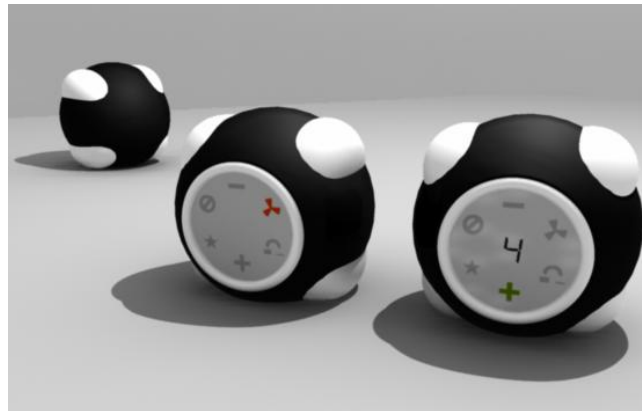


figure 2. Each Thrower can be one of six different types. Each type determines how the ball is played in the game.

Technology

The technology that supports Trinet is fairly simple. The Trinet is made up of a simple circuit board, a micro-controller, infra-red receiver, battery power supply, and a Bluetooth® receiver and transmitter. The Throwers are made up of a display screen, a simple circuit board

with a small stamp micro-controller, small watch-sized battery supply, infra-red transmitter and a pedometer. Bluetooth® is the most advanced component of the system. Currently, Bluetooth® can be implemented for very low costs and has a transmit-receive range of up to 300feet. Bluetooth is also designed for low power consumption which makes it ideal for Trinet.

Summary

This project promotes the idea that games of the future should allow humans to interact with the world in a physical and more natural way. Console and arcade games force users to interact in an awkward and secluded fashion; games of the future can introduce less restrictive gaming environments (similar to Laser Tag and DDR) but without the infrastructure expenses and geographic constraints. By utilizing advanced forms of digital technology, rich experiences with dynamic game play can be achieved. Furthermore, intelligent games of the future will improve the speed at which users can enjoy games by reducing the complexity required to understand and begin the game. Technology should be an enabler and serve to promote the highest level of enjoyment from a product.

References

1. Kuttinen, Petri. History of Arcade Games. <<http://users.tkk.fi/~eye/videogames/arcade.html>>
2. Beyer, Hugh and Karen Holtzblatt. Contextual Design : A Customer-Centered Approach to Systems Designs. Morgan Kaufmann, 1997.
3. Cooper, Alan. The Inmates Are Running the Asylum : Why High Tech Products Drive Us Crazy and How to Restore the Sanity. Sams, 2004.



Icon orientation

-  **Ball Number**
designates the number of plus or minus points
-  **Minus**
Subtracts points from the targeted player's Trinet
-  **Plus**
Adds points to the targeted player
-  **Zero**
Zeros out the players bar and removes a radiation if a radiation is in the Trinet before the zero lands in the Trinet..
-  **Radiation**
contaminates the players base. If the player gets 3 of these they are out of the game.
-  **Invincible**
prevents any two negative throwers from affecting the trinet. (the radiation or the minus)
-  **Double**
Takes the current score of the trinet and doubles the point value.

